

CLAIMS

What is claimed is:

A particle shield, comprising: a plurality of flexible shield layers; 2 a resilient support layer between adjacent ones of the flexible shield layers; 3 a protective cover configured to enclose the flexible shield layers; and 4 fasteners associated with the protective cover and capable of releasably securing 5 the flexible shield layers to a structure to be protected. 6 uj UII The particle shield of claim 1, wherein the support layer includes a space 2. 1 W qualified open-cell foam. 2 01 Ŋ The particle/shield of claim 1, wherein the support layer includes a space 3. 1 qualified closed-cell foam. 2 The particle shield of claim 3, wherein each cell of the closed-cell foam 4. 1 contains a predetermined low pressure gas. 2

The particle shield of claim 1, wherein the support layer includes a

2 ceramic foam.



The particle shield of claim 1, wherein the support layer has one or more 1 6. portions removed therefrom. 2 7. The particle shield of claim 1, wherein the fasteners include one or more 1 Velcro[™] fasteners. 2 The particle shield of claim 1, wherein the fasteners include one or more 8. 1 snap fasteners. 2 The particle shield of claim, wherein the fasteners include one or more 9. 1 2 straps. The particle shield of claim 1, wherein at least one of the flexible shield 10. 1 layers is made of a ceramic fabric. 2 The particle shield of claim 1, wherein at least one of the flexible shield 11. 1 layers is made of a high-strength fabric. 2 The particle shield of claim 1, further comprising at least one thermal 12. 1 insulation layer. 2

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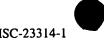


The particle shield of claim 1/ wherein the protective cover is made of an 13. 1 abrasion resistant material that has an absorptivity to emissivity ratio selected to provide 2 3 a predetermined level of thermal protection. 14. The particle shield of claim 1, wherein the protective cover is vented. 1 The particle shield of claim 1, wherein the protective cover is flame 15. 2 retardant. 3 16. The particle shield of claim 1, wherein the protective cover is optically 5 reflective or absorptive. A protection system against hypervelocity particles, comprising: 17. 6 means for shocking the impacting hypervelocity particles to thereby substantially 7 fragment or vaporize the hypervelocity particles; 8 means for supporting the shocking means in a resilient manner; 9

1 18. The protection system of claim/17, further comprising means for reducing 2 a size and volume occupied by the protection system.

means for securing the shocking means on a structure to be protected.

means for enclosing the shocking means in a cover layer; and



- The protection system of claim 17, further comprising means for 19. 1 deploying the shocking means on a structufe to be protected. 2
- 20. The protection system of claim 17, further comprising means for thermally 1 2 insulating the shocking means.
- of claim 17, further comprising means for 21. The protection system 1 substantially venting gas particles produced by the impact of the hypervelocity particles. 2
- The protection system of claim 17, further comprising means for 22. 1 substantially containing debris produced by the impact of the hypervelocity particles. 2
- A method of protecting against hypervelocity particles using a flexible 23. 1 multi-shock shield, the method comprising: 2
- reducing a size and volume occupied by the flexible multi-shock shield; 3
- transporting the flexible multi-shock shield to a desired location; 4
- expanding the flexible multi-shock shield to its initial size and volume; 5
- securing the flexible multi-shock shield on a structure to be protected; and 6
- shocking the hypervelocity particles with the flexible multi-shock shield. 7
- 24. The method of claim 23, further comprising conforming the flexible 1 multi-shock shield to a surface of the structure to be protected. 2

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- 1 25. The method of claim 23, further comprising releasing the flexible 2 multi-shock shield from the structure to be protected.
- 1 26. The method of claim 23, further comprising stowing the reduced volume 2 flexible multi-shock shield in a storage location.
 - 27. A hypervelocity particle shield, comprising:
 - a plurality of spaced apart flexible shield layers, at least one of which is made of a flexible ceramic fabric;
- a resilient support layer between adjacent ones of the flexible shield layers, the resilient support layer including at least one space qualified foam layer;
 - at least one thermal insulation layer disposed on the plurality of flexible shield layers;
 - a vented, abrasion resistant protective cover configured to enclose the flexible shield layers and having an absorptivity to emissivity ratio selected to provide a predetermined level of thermal protection; and
- fasteners attached to the protective cover and capable of releasably securing the flexible shield layers to a structure to be protected.
- 1 28. The hypervelocity particle shield of claim 27, wherein the space qualified 2 foam layer includes an open-cell foam layer.



- 1 29. The hypervelocity particle shield of claim 27, wherein the space qualified
- 2 foam layer includes a closed-cell foam layer, each cell therein containing a predetermined
- 3 low-pressure gas.
- 1 30. The hypervelocity particle shield of claim 27, wherein the support layer
- 2 further includes a ceramic foam layer.
- 1 31. The hypervelocity particle shield of claim 27, wherein the support layer
- 2 has one or more portions removed therefrom
- The hypervelocity particle shield of claim 27, wherein the fasteners
- 2 include one or more snap fasteners
- The hypervelocity particle shield of claim 27, wherein the fasteners
- 2 include one or more straps.
- The hypervelocity particle shield of claim 27, wherein the fasteners
- 2 include at least one Velcro[™]/fastener.

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